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ON THE OCCURRENCE OF THE NEEDLE-TAILED SWIFT FOR THE SECOND TIME IN ENGLAND.

By G. B. Corbin.

So far as I am aware, but a single instance of the occurrence of this species in the British Islands has been hitherto recorded. In July, 1846, a specimen shot at Great Horkesley, near Colchester, was forwarded (in the flesh) for preservation to the late Thomas Hall, birdstuffer, of the City Road, and while in his hands was examined by Messrs. Yarrell, Doubleday, and Edward Newman, and was recorded in 'The Zoologist' for that year.*

The rarity of its visits to Western Europe is hardly to be wondered at, seeing that its true home is in Eastern Siberia, whence it migrates into India, Persia, China, and Australia, where it is found as a winter visitant. Its powers of flight must be truly marvellous to enable it to traverse the vast intervening space which separates these countries from the British Islands.

I have now the pleasure to record its recent occurrence in Hampshire. The unusual abundance of Swifts in many localities during the summer of 1879 has been the subject of remark in these pages, and in this neighbourhood they were extremely numerous. On the evening of July 27th I saw two strange birds flying about over the river in company with Swifts; but they kept a long way off, so that I could see nothing very peculiar about them, except that they appeared to be larger than the rest of the company, and their flight, although resembling that of their fellows, was somehow different.

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* 'Zoologist,' 1846, p. 1492. See also 'Zoologist,' 1863, p. 8329.

My curiosity was awakened, and the next evening I was at the same place watching for the strangers, but the dull cold weather prevented my seeing them. In the course of a week, however, I had the gratification of seeing one so near that the white throat, the white under the tail, as well as the pale patch on the back, were plainly visible. I noticed then that it sought its food indiscriminately amongst the Swifts, Swallows, and Martins, and was not particular about confining itself to one stratum of atmosphere as the other species did; for it is well known that if Swifts and other species are feeding at the same time they seldom mingle with each other, or occupy the same height in the air. I also observed that the bird in question often had a sort of poising flight, reminding one of the Nightjar, but at other times it had an equal, if not superior, dash of wing to the Common Swift; and I could well understand this when, a few days later, I held in my hand what I have every reason to believe was one of the two birds I had seen, for its length of wing, coupled with its superior weight, would give it such an impetus as I have described. It was killed about the 26th or 27th of July, whilst flying over the river, about two miles from where I first observed it, and what I suppose was its mate, but the man who shot it did not see another like it.

Altogether this interesting stranger is a handsome bird. It measured seven inches and three-quarters from its beak to the end of the spines of its tail, and the wings when closed extended nearly three inches beyond them. The wings themselves measure eight inches from the carpal joint to the tip of the longest quills; the two outer quills are of equal length, and the longest in the wing. The beak is short and black, rather broad at the base, and the nostrils are somewhat large; from the tip of the beak to the inside of the gape it measures three-quarters of an inch. Its eyes, which were of a very dark brown hue, appeared sunken, in consequence of the feathers of the head seeming to overhang them; and this appearance was not due to the bird having got stale, for it was quite fresh when I had it, and the eyes were bright and life-like. Its legs are short, toes rather long, and the claws very much curved, and a peculiarity about the foot is that the hind toe is not situated at the back of the leg, but on the inside, so that the outer and hind toes seem to be in a line with each other. Legs and toes brown; claws paler. The forehead and throat, as well as the under tail-coverts, are white; and there is a broad irregular line of the same colour extending from the tail to the thigh. The head, neck, wings, and tail are black or very dark brown, with very beautiful shades of green and purple in different lights. In the centre of the back is a very pale patch, almost white in the middle, but shading off to a pale brown as it reaches the dark tail and brown breast, and under parts. The inside webs of the quill-feathers of the wing are also of a pale brown or grey; in fact the two or three nearest the body are quite white, and were visible when the bird was flying, and even conspicuous when the wings were closed.

The chief characteristic feature in the bird is that from whence it takes its name—*viz.*, the spines of its tail. The feathers of the tail are almost of equal length and ten in number, the shaft of each being prolonged beyond the webs nearly a quarter of an inch in the six middle ones, but not quite so long in the other four. The needle-like spines, which end in a sharp point, are stiff, black, and shining, like the shafts, of which they are a continuation.

The weight of the bird was just under three ounces, and the body was plump and well-conditioned, indicating that it had been living well. I examined the stomach, and found it contained a comparatively large mass of insect remains, amongst which portions of the common wasp were very conspicuous, the hard horny thorax of two of these creatures being intact. Amongst the mass also were the two fore-wings of some moth, so doubled and rubbed that I could not recognise the species at first, but on a closer inspection I have not much hesitation in saying they belonged either to *Leucania pallens* or *L. impura;* and as these two species of moths naturally inhabit a damp or marshy situation, I am probably correct, although, as far as my experience goes, they seldom fly in the daytime, and yet I suppose the bird must have taken them on the wing like the rest of its food. From the fact of wasps forming part of the diet, it seems that even stinging insects are not objected to, but possibly anything of the kind on the wing is readily taken by this bird, and when the mouth is open it would be capable of securing an insect of considerable size. That this bird was a general feeder is quite certain, for, besides what I have mentioned, there were several wing-cases of some small Coleoptera in the stomach.

I am unable to say what became of the other bird I saw on the evening when I first observed them, but that it was one of the same species I feel sure.

[This specimen, now carefully figured by Mr. F. W. Harris, we have had the pleasure of examining, and it was exhibited by Professor Newton at a meeting of the Zoological Society on the 6th January last. Although described by Mr. Gould, in his 'Birds of Australia,' as "the largest of the *Cypselidæ* yet discovered," it does not strike us as differing much in size from the better known Alpine Swift. Like that species it has a white throat; but, unlikeit, instead of a white belly it has the under tail-coverts white, and this white extends up the flanks, giving the bird the appearance of having white sides. A remarkable feature also is the very pale coloration of the back, which may be described as smoke-grey, contrasting strongly with the sooty black wings.

Mr. Gould, who had opportunities of personally observing this species in Australia, and of examining recently killed specimens, states that the keel of the sternum, or breast-bone, is unusually deep, and the pectoral muscles more developed than in any other bird of its weight. Its powers of flight he describes as truly amazing. He never saw it perch, and it rarely flew sufficiently low to be secured by a shot, being, with the exception of the Crane, the most lofty as well as the most vigorous flyer of all the birds he observed in Australia.

We may remark that, although generally called "Spine-tailed," the oldest distinctive English name is "Needle-tailed," proposed by Latham.* The generic name *Acanthyllis* (usually, but erroneously, written *acanthylis*) is derived from ακανθυλλις, a diminutive form, but having the same signification as ακανθις, meaning "thorny" or "prickly," and appropriately refers to the remarkable character of the tail-feathers as above described. What the particular use of these feathers may be can, at present, be only conjectured, since we are without any information on the subject; but since Jerdon has stated, on the authority of the late Col. Tickell, that this Swift breeds among the huge wall-like crags of the Himalayas, it is not unreasonable to suppose that the needle-like extremities of the rectrices may subserve a similar purpose to the stiff tail-feathers of the Woodpeckers, and enable this bird to cling with greater security to the crags amongst which it builds. It is remarkable that, with the exception of the specimens observed in England, none are recorded to have been met with in Europe.—Ed.]

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* The Needle-tailed Swallow, Latham, Gen. Syn. Supp., vol. ii., p. 307; and Pin-tailed Swallow, Latham, Gen. Hist. Birds, vol. vii., p. 208.

ON THE DECREASE IN SCOTLAND OF THE GREATER SPOTTED WOODPECKER.

By J. A. Harvie-Brown.

Many accounts are to be found of the former occurrence of the Great Spotted Woodpecker as a nesting species in Scotland, more especially in the ancient forests of Rothiemurchus, Tarnaway, and Spey, and of Strathglass and other portions of Invernesshire, along the banks of the Caledonian Canal, and Loch Ness-side. It will be unnecessary, therefore, to adduce evidence of the fact,—although I possess a considerable amount of material for the purpose,—but a few remarks suggest themselves.

First, this bird does not seem to have been a widely or generally recognized species as a resident in Scotland, even at the comparatively early date of 1791—96, for no records of its occurrence during summer are given in the 'Old Statistical Account of Scotland,' although it is mentioned as an autumn visitant.* Even so late as 1840, MacGillivray wrote of it as "in all parts rare," though "a permanent resident." †

Evidence, however, of its abundance, or presence, in these parts of Scotland may be gleaned from Stuart's 'Lays of the Deer Forest,' Rev. Lachlan Shaw's 'History of the Province of Moray,' and many other sources—both published and unpublished. Sir Dudley Majoribanks, Bart., who has assisted me with much interesting correspondence on this and kindred subjects, writes:— "Hugh Frazer says it was a favourite cage-bird, and that the Priest at Glassburn—seven miles from here, *i.e.*, from Guisachan

* 'Old Statistical Account,' 1791-6. An old record well worthy of consideration.
† 'British Birds,' vol. iii., p. 80. 1840.

House—taught one to perform all sorts of tricks.* He fixes this at forty years since." Sir D. Majoribanks also states that both Frazer and Rory MacDonald "say that the bird was common previously to 1851, but neither can fix the time of its disappearance, or when it began to grow of scarce occurrence." He adds, "I have no manner of doubt about the Woodpecker being *Picus major*, and I can state most positively that the holes, pointed out to me as the work of the Woodpecker, were quite capable of admitting any British Squirrel (more especially ones of this district), being the size of ordinary rat-holes." Another reason assigned for the decrease and total disappearance of the species is, that, after smuggling came in, the smugglers made use of the decayed trees for firing, which the proprietors winked at so long as they did not touch the sound trees; but this cannot be held widely and generally applicable, or sufficient in itself to account for their present scarcity. In 1855 there were "hundreds and hundreds of white trunks of firs burnt and drying within a mile of this house."

The Rev. George Gordon, of Birnie, in his 'Fauna of Moray,'† states that—"Two specimens were procured in 1838, by Mr. Wink, from the woods of Castle Grant, which it has long been known to inhabit." Mr. Gordon, writing to me later, adds, "I can well recollect that Mr. Wink, when I asked him, had no doubt of getting specimens from the gamekeepers, which he did."

During the breeding season of 1867-68, Mr. R. Gray‡ examined specimens shot in Banff-, Aberdeen-, and Inverness-shires. The last shot at Guisachan was got in the spring of 1869, by one Henderson, as I am informed by Sir Dudley Majoribanks.

All my own notes of its occurrence since that date refer to its appearance in winter. There are still numerous traces of its "boring" and "tapping" at Guisachan; and at Carr Bridge, and on Speyside generally.

In no instance can any of my witnesses, now living, state precisely at what time the bird began to get scarce, nor can any of them, with one exception, suggest any reason for such decrease. The general opinion, widely current in Invernesshire, is that Squirrels were the primary cause of this decrease, but only one writer has attempted to describe the *modus operandi* by which this was effected.

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* Stevenson, in his 'Birds of Norfolk,' also makes mention of the fact that this species "thrives well in confinement," and is "very active and mischievous" (*op. cit.* vol. i., p. 291), and I have other evidence of the fact that this bird was a favourite cage-bird in Scotland before it became scarce.

† 'The Zoologist,' 1844, p. 510.

‡ 'Birds of the West of Scotland,' p. 190.

Mr. C. Y. Michie, in his Prize Essay upon 'Diseases of Forest Trees,' written in 1865, says:—"Where Squirrels are most numerous Woodpeckers are most scarce. In conversation with a sawyer, a man of observation, a few days ago, he told me that near to a saw-pit where he was at work a Woodpecker hatched its eggs, and when the young ones were nearly full-fledged, he observed, one morning, a Squirrel enter the nest and carry off a young bird: this was again and again repeated by the Squirrel till the whole brood was destroyed. It is now," continues Mr. Michie, "pretty generally known that Squirrels eat the eggs of Wood Pigeons, from which it may pretty safely be inferred that the eggs of the Woodpecker and other insect-devourers will share a similar fate." Mr. Michie also makes the statement that, where Squirrels abound, a *certain insect* commits the greatest ravages. He then tells us:—"In Strathspey, about twenty years ago, Woodpeckers were very numerous; the holes which they bored in the trunks of the old trees may be seen at the present time in hundreds, whilst now, not a single Woodpecker is to be seen in the whole Forest. About the year 1840,* the first Squirrel was seen in Duthell Forest; and now they are seen in hundreds and appear on a rapid increase."

In this essay Mr. Michie clearly proves his case against the Squirrel for damages done to trees; but the evidence of its destructiveness to the eggs and young of the Woodpecker is not so clear in my estimation. Not that I doubt the solitary instance related above, for there is other satisfactory evidence that Squirrels do occasionally carry off eggs and young birds, and the nest of the particular Woodpecker referred to may possibly have been more than usually accessible. But I wish to combat the general impression which is said to prevail in the district referred to, that this is a common or frequent habit of the Squirrel. I am quite of the opinion expressed by Prof. Newton in letters to me, that the holes made by the Great Spotted Woodpecker are, as a rule, not large enough to admit the body of a Squirrel, if indeed they ever are. Indeed, as Prof. Newton adds, I doubt if even the nesting-holes of *Picus viridis* are sufficiently large to admit the body of a Squirrel. Moreover, I have good reason to believe that the taste acquired by the quadruped for birds' eggs is not a general one, but only acquired by comparatively few individuals, much blame having attached to it from a judgment founded upon isolated instances which have come under the notice of a—comparatively speaking—small number of observers. There is some evidence of the taste being acquired, in the first instance, from the inquisitiveness of the animal which leads it to carry to its "dray" any unusual-looking objects. Birds' heads and wings have been found in Squirrels "drays," and the conclusion has been drawn—I think somewhat hastily—that they were brought there solely for the purposes of food. It is more likely that some truly carnivorous animal—such as a Stoat or Weasel—had killed the bird, and, when it finished its meal and retired, left the head. The Squirrel, from sheer curiosity, descended and carried off the fragments. Squirrels, as has been well ascertained, eat *Fungi* of several species, but there are others which, although it does not eat, it carries up trees and sticks into clefts of the branches. I have collected much evidence in support of this fact. I agree also with the opinion expressed by several correspondents—notably Captain Dunbar Brander, of Pitgaveny, who lives in the centre of the district, where the prejudice against the Squirrel is perhaps strongest, that:—"Some few Squirrels have learned that eggs are good, and will destroy them; the great majority do not. One dog in ten will eat an unbroken egg; one cat in fifty has found out that eggs can be broken. There is nothing a cat likes more than an egg, but it must be broken for her. . . . . Though often trapped with an egg, that proves nothing. Squirrels are inquisitive. . . . . . Birds are not generally afraid of a Squirrel, nor—*except in isolated instances*—do they give battle to or attack Squirrels, though these isolated instances, coming under an observer's notice, are very liable perhaps to cause him to judge ill of the species collectively."

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* This date is one of many which go to prove a natural resuscitation of the Squirrel in the Valley of the Spey.

The published references to the "carnivorous and oophilous propensities of the Squirrel" are very numerous, and would fill some pages of 'The Zoologist.' It is not my object here to discuss further this general accusation, but rather to shield the

Squirrel from the more particular accusation as regards the Woodpecker.

We have still to consider what causes have been at work in influencing the decrease of Woodpeckers in the North of Scotland. In England, I understand, one reason given for a decrease is the more frequent thinning out of decaying wood, and, generally, a higher system of Forestry. This may have had some operation also in the Inverness Forests, but if so I do not regard it as the sole cause, though it may perhaps have completed or hastened the decrease. Sir Dudley Marjoribanks, whom I have already quoted, makes mention of an extraordinary increase of Starlings, Jackdaws, and Sparrows, which species prior to 1851 were unknown at Guisachan. As nearly as can now be ascertained, 1851 was also about the date when Woodpeckers began to decrease in numbers. Mr. F. Norgate, in his interesting article on the "Nesting of the Nuthatch in Norfolk,"* has pointed out what a very large percentage of the nest-holes of both *Picus viridis* and *Picus major* are occupied by Starlings, soon after they are made, observing that nearly ninety per cent. of the nesting-holes of the Great Spotted Woodpecker are thus taken possession of. I have for some time been collecting materials for an exhaustive account of the Greater Spotted Woodpecker in Scotland, but on reading Mr. Norgate's article it occurred to me to forward these few notes for comparison with his, reserving for a future occasion a more exhaustive account of the species, should such be considered desirable.

In conclusion, if many of the ancient birch and other trees occupied by the Woodpeckers have perished from age, thus restricting their breeding-haunts, and if a large number of those still standing are occupied by Starlings and Jackdaws, perhaps even by Sparrows, a case may actually be made out against the survival of the Woodpecker from direct causes.

I am still collecting information on this subject, and shall be glad of further particulars from observers in any part of Scotland heretofore inhabited by Woodpeckers.

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* *Vide antea*, p. 41.

THE SKUA GULLS AND THEIR RECENT MIGRATION.

By Howard Saunders, F.L.S., F.Z.S.*

The attention of ornithologists has lately been drawn to an unusually abundant autumnal migration of several species of Skuas, and numerous captures have from time to time been recorded in these pages and in 'The Field.' Inquiries have also been made, and discussion excited, respecting the different plumages of the various species; and, in a recent number of 'The Field,' an appeal has been made to some specialist who has handled more than an average number of specimens to pronounce on the distinguishing characteristics of the Pomatorhine and the Richardson's Skuas. It is easier to do this than to point out distinctions which no one can possibly mistake in any stage between the Richardson's Skua and Buffon's Skua; but, as I have long made the Gulls and Terns my special study, I may perhaps be able to give some hints upon these and other points. It should, however, be remembered that I by no means imagine that I know all about the subject, and it is mainly in the hope of receiving information from those whose opportunities for observation have been superior to my own that this sketch is written.

The most interesting point about the recent migration of the Pomatorhine Skuas was the statement made by Mr. T. A. Nelson, of Redcar, that he obtained amongst others "two birds entirely black, the tail-feathers about three inches long, legs black, and bills exactly similar to the old birds." This melanism was well known as occurring freely in the case of Richardson's Skua, and might therefore be expected in its congener; but I had never had the good fortune to examine a black Pomatorhine until within the last few days, when I inspected one in Mr. E. Booth's magnificent collection of British birds at Brighton. In this fine specimen the central tail-feathers are about as well developed as in any other adult, the feet and legs are both black, and the plumage is of a deep sooty colour—as complete a melanism, and as fine an adult, as one could hope to see. With regard to Mr. M. Browne's inquiry as to the invariable distinctions between this species and Richardson's Skua, my friend Mr. R. Warren has already supplied him with particulars; but it may not be a vain repetition to point out here the distinguishing characteristics in the immature examples of both species, which alone can present any possible difficulty. The general dimensions of the Pomatorhine are considerably larger than in Richardson's Skua. In the smallest immature Pomatorhine the wing (measured underneath, and therefore short measurement) is 13·7 in. from carpal joint to tip, and the tarsus 2·5 in.; whilst in Richardson's these parts are respectively 12 in. to 12·5 in. and 1·7 in.; also in the former there is much more white on the inner webs of the primaries, and the central rectrices, besides projecting but little, have their points of a rounded shape, very different from the pointed form assumed by those feathers in a Richardson's Skua of even a few months old. The young of the Pomatorhine are usually of a sooty brown, more or less mottled with white on the under parts with advancing age, until in very old birds the dark pectoral band entirely disappears, and the whole breast and abdomen down to the vent (which is dark) becomes white. Specimens in such fully adult plumage are, however, rare; and in one, obtained in the Faroes in May, 1877, the central rectrices are of the unusual length of 3·7 in., their rounded and half-twisted shape being wholly different from those in any other species.

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* Reprinted from 'The Field,' of January 17th, 1880.

In its migrations, so far as are recorded, the Pomatorhine seems to have been more frequently noticed along the east side of Britain, after which it suddenly turns up in tolerable abundance on our S.W. coast, especially at Torbay; but from these scattered facts few deductions of any value can be drawn, for observers are few and far between, and it is but rarely that these birds come sufficiently close to land to afford opportunities for observations. As Mr. Booth pertinently remarks, there is probably nothing unusual in the present migration beyond the fact that, owing to the winds and weather prevalent at the time, the birds have come closer to the coast, and have consequently been more remarked. If the fishermen all round our islands were practical ornithologists, and in the habit of recording their observations, we should in a few years be wonderfully enlightened, not only with regard to the migrations, but as to the frequent occurrence some thirty or forty miles from shore, of species which are often described as "very rare and accidental visitors."

The men who have been out all night fishing, or those who have the watch on board ship at the time that movement begins in the bird world, are those who have the best chances for observation; but—I speak from a sad sense of my own deficiencies—though the spirit is willing, the flesh is weak, and even the ornithologist has at such a time been found sheltered from the blast, and trying to coax a pipe of damp Cavendish, regardless of the winged forms which were animating the dawn-lit air and waters. Of course it is hopeless to expect our fishermen to record migrations, when even our sailors and our amateurs do not do half what they might; but, until we try to avail ourselves of the stores of information these men could give if they were asked, we shall never know much of migrations of sea-birds. There is, however, some hope from the reports which are now being carefully prepared by Mr. John Cordeaux, Mr. J. A. Harvie Brown, and others, from notes kept by those employed on the lightships and lighthouses off our coasts; but, after all, it is on the fishing grounds that sea birds of all kinds most do congregate.

Of the life-history of the Pomatorhine Skua less is known than of any other member of the family. It was found as far north as Parry went in his famous boat voyage, *viz.*, 82° N. lat., and it ranges in summer throughout the greater part of the Arctic regions, being known to breed on the Taimyr "barrens," and on the Boganida in Siberia, where Middendorf obtained its eggs; and it is also believed to breed to the northwards of Egedesminde in Greenland. There are probably many other breeding-places still undiscovered, but actual proof is still wanting, and authenticated eggs are to be found in very few collections. In autumn it goes southward, and isolated specimens enable us to trace its course down the West Coast of Africa, and, touching at Moulmein, as far as Cape York in North Australia; whilst on the American side it has been obtained as far south as Pennsylvania on the east side, and Alaska and the Pribilov Islands on the west. The 'Challenger' also obtained a fine adult in Japan. It may, and probably does, visit other coasts; but that is all we know of its range, information being, as usual, most meagre respecting the North Pacific district.

Richardson's Skua, *Stercorarius crepidatus*, is a better known species, and also one which is far more puzzling in its varying plumages. I went up to Shetland last July, with the object of studying the young in down and in their first plumage, and arrived at some tolerably clear conclusions; but there are still several points which could not be cleared up by one investigator, nor in a single season. It may confidently be stated that there are two extreme varieties in the adults—the one having the breast and under parts of the same dusky hue as the back; and the other in which the under parts are white. These two varieties breed together, and pairs are found consisting of two white-breasted birds, or of one white and one dark bird, or of two dark birds. Where light forms are mated, the young are perfectly recognisable, and the same is the case with the offspring of two wholly dark birds; the young of a light and a dark form are also distinguishable; but the question to be solved is, What are the offspring of these "mixed marriages" on attaining maturity? Each pair has two young, but it is not altogether easy to find out whether one of these resembles one parent and one resembles the other, because these young, from the downy stage upwards, leave the shallow "nest," if it may be called so, and are to be found squatting about on the moors so far apart as to preclude any positive identification. The question can only be solved by selection of the young of such a pair, and by keeping them in captivity for several years; and it is to be feared that this experiment will not be carried out for some time to come. I do not think that the dark plumage is a sign of immaturity, or that birds which breed in this plumage will ever become light-breasted, for the dark breeding birds have the acuminate feathers on the nape of quite as burnished a yellow colour as the light forms, and that is a sure sign of age in all the Skuas; but whether the half-bred birds which are found breeding with partially white breasts ever lose their gorget and become entirely white, is still unknown to me.

There are few more interesting sights than a breeding-place of Richardson's Skua. As the visitor traverses the wild moorland, furrowed by the rain with innumerable channels, sharp-winged angular forms rise against the sky, and are seen skimming the heather with a flight which has been described as "hawk-like," but which differs in its peculiar "balancing," as distinct from "hovering," from that of any other bird. As the intruder advances, a loud "mee-ah" is heard, and this may be followed by a vicious "swish" past the ear, not always unaccompanied by an actual blow from the wing. My hat was struck three times by one bird, but always from behind; and when I followed it, however furtively, with my eye, it always flinched from the swoop. There is great difference in the boldness of individuals, and but few swooped very close. Those that did so were always dark birds; but that might arise from predominance of that colour in the colony. This attack is apparently to divert the attention, and shows you are getting "warm;" but as soon as the young are discovered, and even whilst they are being handled, the menacing "mee-ah" changes into a plaintive "ee;" and no further attack is made upon the spoiler, although the indignant parents often relieve their feelings by dashing at others of their own species, or any bird in their vicinity. I once saw an unfortunate pair of Whimbrels, which were in a great state of alarm about their own young, most viciously attacked by a couple of offended Skuas. There is much difference in the individual characters of the young; for, though all squat perfectly still until they are handled, some will then fight viciously with their feet, and make free use of their claws, whilst others will even follow up and worry an extended finger with the bill. This is quite irrespective of age, some little fellows in half-down being more savage than others of double their size.

In the autumn the migrations of this species are pushed even farther southwards than that of the preceding, for it appears to pass our winter off the Cape of Good Hope, and also on the Mekran coast and the Persian Gulf, and has even been obtained in New Zealand. I think, from descriptions, that it visits Rio de Janeiro; but the record is very deficient with regard to South America, and information on the subject is much to be desired from both the east and the west coasts. In North America it is tolerably abundant along the Atlantic seaboard, and reaches through the Arctic Regions to the Pacific side, from whence we have little information respecting it. All the specimens brought home from the far north are white-breasted, which looks as if the dark was comparatively a more southern form. It was to this latter that the name of Richardson's Skua was originally applied, under the erroneous impression that it was a distinct species; but I employ it because it is generally known, and is the only one which cannot produce any confusion—other terms, such as "Arctic Skua," &c., having been applied to several species.

Several examples have also been recorded of the capture of the Long-tailed or Buffon's Skua, the species to which Linnæus gave the name of *Larus parasiticus;* and as *Stercorarius parasiticus* it ought be known, although unfortunately that name has sometimes been erroneously applied to the preceding species. Linnæus gave an unusually precise and accurate description, calling the central tail-feathers "longissimis," and stating that the *shafts* of the *two outer primaries* are *white*—the inference being that the shafts of the other primaries are *not* white. Now, this is just the feature which serves to distinguish the two species in *all* ages, whilst there are other points which prevent any mistake in the adults. It is true that the young of Buffon's Skua is rather smaller, and, so far as one can judge from the few specimens available, it is of an uniformly smoky colour, mottled with greyish, but without any of that *brown* shade so frequent in Richardson's; the central tail-feathers also project more than in Richardson's of the same age. These distinctions are, however, not always so strongly marked as could be wished; but a reference to the *primaries* will decide the question. In the Buffon's Skua the shafts of the two outer primaries are *white,* those of the remaining primaries being dusky; whilst in Richardson's Skua the shafts of *all* the primaries are *white* throughout the greater part of their extent; and even in young birds it is only towards the tips that the shafts are of a shade at all approaching that of the webs. In the young of all three species the feet are variegated, being of a livid or clay colour posteriorly, and blackish towards the nails, becoming black at maturity; so that these marks are no specific distinction. In the adult Buffon's Skua the central rectrices project about eight inches beyond the others, whilst in Richardson's they seldom exceed the lateral feathers by more than three inches.

Buffon's Skua occurs throughout the whole of the Arctic Region, and has been found breeding on the fells of Lapland, on Novaya Zemlya, and in portions of Siberia; but its autumnal and winter range is somewhat difficult to trace with precision, owing to the confusion which exists with regard to this and the preceding species. I do not at present feel any certainty respecting the correctness of its identification beyond the Straits of Gibraltar, but it probably goes farther south in pursuit of the Terns, which its dashing rapid flight enables it to rob with ease. In this, as in many other cases, "What is hit is history: what is missed is mystery."

There remains but one other British species, the Great Skua, *Stercorarius catarrhactes,* a few examples of which have also been obtained this autumn. It is nowhere numerically abundant, and in the Faroe Islands, once its stronghold, it is rapidly decreasing, being classed amongst the injurious birds for whose destruction a reward or "neb-toll" is paid. In Shetland, where I visited one of its breeding-places, it is most carefully preserved, otherwise it would long since have become extinct there, for the bird knows no fear, and attacks the intruder as soon as its territory is invaded. First comes a swoop close to the head, another, and another, till the young are actually discovered, and then one or both of the old birds charge boldly, even when you face them. It is no sly attack from behind, as with the "Allan" (Richardson's Skua), but as you front the bird it comes down as straight as an arrow, sweeping the heather as if it were going to strike the very centre of your body. At about twenty yards' distance down go the talon-armed feet, their webs spread to the full extension, and the eyes seem to stand out from the sides of the head, as the enraged bird swirls past, just clearing the top of your head, and making the whole atmosphere vibrate with the rush of its pinions. Round it swoops, and meanwhile perhaps the other one comes down in a like manner; and so the game is kept up till you are tired, for the birds do not seem to weary so long as their domain is molested. As it is no joke to be hit on the head by such a large bird, and as it might at the same time hurt itself (an accident to be regretted, as Great Skuas are far rarer than ornithologists), it is advisable to hold a stick a little above the head, as the birds will always clear it. In this, as in all the other species, two is the usual number of eggs in each nest; but last year, owing perhaps to the weather, I fancy that many pairs only reared a single young one. Beyond the Shetlands and the Faroes, the Skua breeds in a few places in Iceland, and is also found apparently, in small numbers, throughout British North America and across to California, where, however, only one specimen is on record as having been obtained. This sudden break-off in its distribution is somewhat remarkable, inasmuch as on the South Pacific Coast, from Peru to the Straits of Magellan, there is another species (*Stercorarius chilensis*), which is more closely allied to *S. catarrhactes* than to *S. antarcticus*, a third species of Great Skua, which also inhabits the southern hemisphere, ranging from New Zealand, throughout the Antarctic Regions and by way of Kerguelen, the Crozets, &c., to the Falkland Islands and the east coast of Patagonia. On its migration the northern Great Skua occurs on both sides of the Atlantic, but it has not been traced farther south than the Straits of Gibraltar, and information is much desired. It is rather an easy species to recognise even on the wing, both from its habit of pursuing and plundering the Gulls and Gannets, as well as from its bold sweeping flight, in which the white mirror on the primaries is a very marked feature; so that some of our naval officers who take an interest in the birds they come across at sea may perhaps be able to supply details respecting it.

In this sketch of the Skuas I have endeavoured, whilst avoiding technical descriptions and details, to give those particulars which appeared most likely to awaken interest and to stimulate research. How much still remains to be learned upon the geographical dtstribution of this sub-family will be only too manifest to all who have read these remarks.

ON THE AIR-BLADDERS OF FISH.[*]

By Francis Day, F.L.S., F.Z.S.

Among the organs existing in fish, few have given rise to more speculation and discussion than the air- or swim-bladder, also termed air-sac or air-vessel, which is a single or variously subdivided sac, or it may be two sacs partially or completely separated one from the other. Situated above the centre of gravity, it is beneath the vertebral column or back-bone, from which it is generally more or less divided by the kidneys: while inferiorly it is separated from the intestines by the peritoneum. As this air-bladder may be present or absent in species belonging to the same genus, and is frequently wanting, it is evident that it cannot be indispensable to a fish's existence, that its functions must be accessory or supplementary to those of other organs under certain circumstances.

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[*] Summary of a Paper read before the Cotteswold Naturalists' Field Club, 17th February, 1880.

If we investigate the origin of this organ in the animal's embryonic state, we find that it originates as an offshoot or bud from the stomach or upper portion of the alimentary canal; that this offshoot elongates, then enlarges at its terminal extremity into what will subsequently be the air-bladder; consequently at some period of the fish's existence there is an open tube connecting the air-bladder with the alimentary canal, into which it opens, usually on its dorsal, rarely on its lateral, and occasionally on its inferior or ventral surface.

In the Dipnoids or highest class of Fishes the air-bladder has stiff walls, is distinctly or indistinctly double, lung-like, and communicates throughout life by means of a duct and glottis with the œsophagus. The duct in *Lepidosiren* and *Protopterus* opens on the ventral or inferior surface of the alimentary canal, as it does in Batrachians and the higher vertebrates. In *Ceratodus* the opening is on the left side, near, but not on, the ventral wall of the pharynx. The duct in the forms enumerated would evidently be homologous to the trachea or wind-pipe, while the functions of the air-bladder are likewise analogous to those of lungs, as these fishes employ them under certain conditions for respiratory purposes, taking in atmospheric air direct.

The Ganoids afford instances very similar to what obtains among the Dipnoids: thus the air-bladder in *Amia* has a lung-like function; its pneumatic tube is short and protected by a glottis, but the position where it opens into the alimentary canal is dorsal and not ventral, as in the Dipnoids and higher classes. *Polypterus*, however, has its opening on the ventral surface of the pharynx: while in *Acipenser* this organ has no lung-like function, it is used merely for hydrostatic purposes, and the opening is that of a lower type, being on the dorsal aspect of the pharynx, and destitute of any valve. The forms adverted to, however, connect the simple air-bladder of the *Acipenser*, or Sturgeon, with the lung-like air-sacs of the Ganoids, and thus with the Batrachians and higher vertebrates.

But these organs are not considered lungs in most fishes by many anatomists, for the reason that the air-bladder is supplied with blood from the adjacent arteries of the body, not direct from the heart, and returns venous blood into the general circulation.

In *Ceratodus,* however, although there is no special vessel employed to convey blood to the air-bladder, still we see this organ taking on a higher character than observed in *Acipenser,* for instance, as the blood returned is purified and carried direct to the heart, which arrangement does not, however, exist in *Amia* and *Lepidosteus,* both of which fishes evidently use their air-bladders for respiratory purposes.

Lepidosiren is doubtless the highest known form of living fish, forming a transitional link between Amphibia and Fishes; to its air-bladder venous blood is distributed and arterial taken away direct to the ventricle. Consequently we find that in this fish, owing to the non-development of gills on the two inferior branchial arches, the blood is not arterialised there, but passes on to the air-bladder for this purpose; for the blood which is carried there is from the returning dorsal portion of the branchial vascular arches prior to their union to form the aorta. In fact, venous blood is distributed to and arterial carried away from this organ direct to the ventricle of the heart. In *Polypterus* we observe the same distribution of vessels, but due to the gills being present on the lower branchial arches, the blood is oxygenated there, and consequently when taken to the air-bladder is not venous, as in *Lepidosiren,* but arterial.

That the air-bladder is homologous with the lungs* of Batrachians and air-breathing vertebrates appear to be proved, as transitional links in the position and functions of this organ can be traced from the *Lepidosiren* and *Ceratodus* (wherein it is distinctly lung-like, and opening on or near the ventral surface of the pharynx) to the *Polypterus* and *Acipenser* down to the Teleostean fishes.

In the bony or Teleostean fishes, we find the air-bladder in adults in two distinct forms. I have already observed that in the embryo it originates as a tube or offshoot from the alimentary canal. This tube may become entirely obliterated, when such forms are termed *Physoclisti;* or else the canal may continue pervious throughout life in the form of a pneumatic tube or safety-valve, connecting the air-bladder with some portion of the stomach or upper part of the alimeutary canal, in which case they are termed *Physostomi.* This pneumatic tube may or may not be furnished with a distinct valve precluding the inlet or exit of atmospheric air.

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* "The air-sac is supplied with branches from the pneumogastric nerve, like the lungs of higher vertebrata." Grant, 'Comparative Anatomy,' p. 546.

In short, among the Teleosteans the air-bladder exists as a closed sac of diverse forms, *Physoclisti*, in the spiny-rayed *Acanthopterygians*, the spineless *Anacanthini*, the tufted-gilled *Lophobranchii*, and the hard-jawed *Plectognathi;* whilst in the remaining orders, the pneumatic duct remains patent, as in the whole of the *Physostomi*, excluding the Family *Scombresocidæ*.

In such forms as swim near the surface this organ is mostly of a comparatively small size, while in those which live near the bottom, as the flat-fishes, *Pleuronectidæ*, it is, as a rule, absent. When this organ is ruptured the fish mostly sinks, turning on its back and remaining at the bottom: on the other hand, some forms which have been hooked or netted at great depths and suddenly brought to the surface without having time to compress or partially empty their air-bladder, the contained gas, being no longer weighed down by superincumbent water, rapidly expands, causing the organ to burst, or else forcing the stomach and upper portion of the alimentary canal into the fish's mouth.

The air-bladder is generally found after death tightly distended with gas, which consists mostly of nitrogen in fresh-water forms, and oxygen in marine genera. It has formed a subject of discussion as to how this gas is generated, but as in those classes in which this organ is a closed sac (*Physoclisti*), it is perceived as well as in others possessing a pervious pneumatic duct (*Physostomi*), one cannot resist believing that the gas may be eliminated in most instances from the blood-vessels lining its interior. Probably the gland which is so apparent in most of the *Physoclisti* serves for the purpose of removing superfluous gas or any deleterious substances, acting in fact as a depurating organ.

The chief uses of this organ in Teleostean fishes appear to be two. (1) Hydrostatic, or for flotation, serving the mechanical purpose of enabling its possessor to maintain a desired level in the water, and which is usually accompanied with the power of removing, expelling, compressing, or dilating its gaseous contents, so that it can rise or fall as necessity occurs. (2) The second use is acoustic, it being partially or entirely employed for hearing by means of various modes of connection with the internal ear.

Among the *Physoclisti*, the majority of which are marine forms, we find this organ as a closed sac, the greatest length of which is usually in its longitudinal axis. In some forms, as in *Holocentrum* and *Sargus*, cœcal processes pass inwards to attach themselves to a membrane closing in a portion of the internal ear. The varieties of air-bladders in the *Physoclisti* are exceedingly numerous, but it is not my purpose to refer to such in this place.

Among the *Physostomi*, or those families of fish in which a pneumatic tube continues pervious throughout life, we find the majority are fresh-water forms, placed intermediate between the *Physoclisti* and the Ganoids. This pneumatic tube possesses the same coats as the air-bladder, an external, fibrous and tough, and an internal, which is mucous and vascular: its length is various, while it is said to be occasionally tortuous. It opens, as a rule, on the dorsal wall of the alimentary canal, or, as in the Herring and its allies, at the terminal extremity of the stomach. But one form among the *Characinidæ*, the *Erythrinus*, is a most interesting link between *Physostomus* Teleosteans and air-breathing Ganoids: in this genus, although the air-bladder is above the alimentary canal, the pneumatic tube passing downwards pierces the left side of the throat. The air-bladder is likewise divided by fibrous partitions, but whether such are exceedingly vascular or not, whether this fish uses this organ for respiration or simply for flotation, there does not appear to be any information on which to decide.

It seems to be the rule, so far as I have yet been able to ascertain, that the fresh-water *Physostomi* have a connection by means of a chain of ossicles between the air-bladder on one side and a process of the internal ear on the other. Instead of a tube filled with gas passing inwards from the air-bladder, as in some *Physoclisti*, to the base of the skull, the connection is entirely of an osseous character. In the *Cyprinidæ* it is more or less as follows:—Three ossicles on either side connect the outer surface of the air-bladder with the atria of the labyrinth, consequently any dilatation or compression of the contained gas must have some effect upon the movement of this chain of bones. These auditory ossicles were first pointed out by Weber, and since his time it has been shown that they pertain, like the capsules of the special organs of sense, to the splanchno-skeleton.

In the same family of Carps we find, in the East Indies, a curiously modified form of Loach, *Botia*. In its habits it can scarcely be said to be a ground-feeder, but appears to be intermediate between the true Carps and the grovelling Loaches. The anterior portion of its air-bladder, or what may be termed its acoustic part, is more or less enclosed in a bony capsule, formed by the parapophyses of some of the anterior cervical vertebræ. Among the true ground-feeding classes, as *Nemacheilus* and *Cobitis*, it almost appears as if the posterior two-thirds of the air-bladder, or that used for hydrostatic purposes, were deficient, this organ being in the form of two rounded lobes placed side by side, below the bodies of some of the anterior cervical vertebræ and where they are enclosed in bone, as observed existed in the anterior part of the air-bladder in the genus *Botia*. It is very remarkable that in the elevated regions of Western Turkestan the air-bladder of the Loach, *Nemacheilus*, has become modified, for there it exists as seen in *Botia*, for which reason Kessler has formed a new genus, *Diplophysa*, for their reception.

Another fresh-water family of *Physostomi*, the *Characinidæ*, residents of Tropical Africa and America, are exceedingly interesting as regards how this organ is modified in respect to hearing, a chain of auditory ossicles extending from it to the internal ear, as existing in *Cyprinidæ;* while, as already observed, one genus, *Erythrinus*, seems to connect the *Physostomi* with the Ganoids. The extensive fresh-water Physostomatous family of *Siluridæ*, or sheat-fishes, has likewise some marine representations, and is more especially found in tropical countries. Among them the air-bladder is remarkably modified, in the majority of instances being apparently more useful for auditory than hydrostatic functions, and as a general rule smaller in fresh-water than in marine species. These fishes are evidently closely allied to the *Cyprinidæ*, and in one respect the air-bladder shows a somewhat similar modification in the two families. I have observed how, in the grovelling Loach and some allied forms, it is more or less enclosed in a bony capsule, and this is seen both in European and Asiatic forms, all of which, however, may be said to be ground-feeders. The Siluroids in India likewise live the life of ground-feeders, and the power of employing the air-vessel as a float appears to be subservient to that of hearing. In the marine forms it has thickened walls, and is attached to the bodies and processes of some of the anterior vertebræ. As we pass inland, however, or towards mountainous regions, this organ becomes more or less enveloped in bone, as observed upon in the Loaches, and, like the *Cyprinidæ*, a chain of ossicles passes forwards to the internal ear. Finding that the majority of these fishes with bone investing their air-vessel were found near the mountains, at once led me to conjecture that such must have something to do with sound. The number of genera existing in India and Burma in fresh water is twenty-five, out of which fourteen have the air-bladder more or less enclosed in bone, and, as all are ground-feeders, it appears probable that one reason at least is to prevent undue pressure on the organ when at great depths.

The chain of auditory ossicles connecting the air-bladder with the internal ear, as far as I know,* is confined to the fresh-water *Cyprinidæ*, *Characinidæ*, and *Siluridæ*, all of which are Physostomous; while that having the lowest organization, its opercular pieces being incomplete, is the *Siluridæ*, and which alone appears to have marine representatives. Whether further investigation will confirm this, time alone must show, but if such should prove to be the rule, it would seem that this forms a connecting-link between such as are marine with those which belong exclusively to the fresh waters.

Among the marine Physostomous forms, all that have been examined, I believe, and in which communications between this organ and internal ear exist, have such by means of cœcal prolongations from the air-bladder and not by a chain of auditory ossicles, which appear to be wanting in marine fishes. This leads one to enquire whether there are any fresh-water fishes that have the connection between these organs, as seen in sea-fish. The Perch has no auditory ossicles, and I should consider it of marine origin; and the same conclusion may be arrived at regarding Trout and the anadromous Salmon.

In conclusion I think it may be affirmed that the air-bladder in fishes is the homologue of the lung of the superior vertebrate forms; that in some of the higher sub-classes it serves as an accessory respiratory organ depurating the blood; that in the majority of Teleostean fishes it is employed for one or both of the following purposes:—as a float, enabling its owner, by compressing or dilating it, to sink or rise to any required level in the water; while, secondly, it assists hearing by communicating with the internal ear; that in those forms in which it has an auditory function we perceive two very distinct modifications: (1) in the marine *Physoclisti* or *Physostomi* a tubular prolongation of the air-bladder itself passes forwards to the interior of the skull, while in fresh-water *Physostomi* the connection is by means of a chain of auditory ossicles: that in such fishes as live the life of ground-feeders a still further modification of the air-bladder may occur, by its being more or less completely surrounded by osseous walls owing to a development of some of the parapophyses of the anterior vertebræ.

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* Most probably this chain of ossicles will be found in some other fresh-water families, but which I have not yet had the opportunity of investigating.

OCCASIONAL NOTES.

WHITE STOATS.—Seeing some remarks in reference to the rarity of white Stoats in 'The Zoologist' (p. 55), by Mr. G. B. Corbin, I beg to state that my keeper brought me the skin of a Stoat which he had caught in a trap on January 29th, which was completely white, with the exception of a very narrow dark brown line on the back of the neck, about a quarter of an inch long, and the characteristic black tip to the tail. As I did not see the animal before it was skinned, I am unable to say whether it had pink eyes or not.—E. J. GURDOW (Hopton, Thetford).

REPORTED DISCOVERY OF THE EGGS OF THE CURLEW SANDPIPER.—At p. 425 of the last volume of 'The Zoologist' attention was directed to Dr. Brewer's announcement of the discovery in North Greenland by an American naturalist of the eggs of the Curlew Sandpiper, *Tringa subarquata*, hitherto unrepresented by authentic specimens in any collection. In the last number of 'The Ibis' (1879, p. 486), Capt. Feilden has criticised this report, and stated his reasons for believing that the discoverer has unintentionally fallen into some error. His remarks are so much to the point, and the subject is one of such interest to ornithologists, that no apology seems needed for giving wider publicity to his letter. Capt. Feilden says:—"At page 375 of 'The Ibis' for 1879, Dr. T. M. Brewer, of Boston, U.S., records that *Tringa subarquata* has been discovered breeding in the district of Christianshaab, in the Inspectorate of North Greenland. If the circumstances of the case, as detailed by Dr. Brewer, bear investigation, and it is a fact that the Curlew Sandpiper has been found nesting in North Greenland, it is a very astonishing addition to the Ornithology of that region. I trust that I may not be deemed hypercritical or ungenerous in suggesting that, if the alleged nesting of the Curlew Sandpiper in North Greenland rests on no stronger evidence than that recorded by Dr. Brewer in 'The Ibis,' it must at any rate be received with caution. The Ornithology of the west coast of Greenland, as far north as the district of Upernivik, or, in other words, to nearly the seventy-fourth parallel of north latitude, has received careful investigation by a number of Danish naturalists, both resident and non-resident in Greenland, embracing such well-known names as Fabricius, Holböll, and the Reinhardts. The Curlew Sandpiper has not been recorded by those observers and naturalists as even an uncommon visitor to the coasts of Greenland; and now to be told that it is not uncommon as a breeding species in the district of Christianshaab may well excite incredulity. Moreover, it may be remarked that the species has never been recognised in Iceland, the Færoe Islands, or on the coast of East Greenland, and is recorded as scarcely more than a straggler along the Atlantic coast of the United States. The breeding haunts of *Tringa subarquata* appear to be the tundras of North-Western Europe and Northern Asia; and I should as soon expect to hear of the nesting of *Tringa Temminckii* or *Tringa minuta* in Greenland as of the Curlew Sandpiper. In thus expressing myself, I do not wish to cast any reflection on Mr. Ludwig Kumlien, who may be a competent observer; for by Dr. Brewer's account the eggs now in the Smithsonian Institution, and credited to the Curlew Sandpiper, were not found by Mr. Kumlein, but were procured through the assistance of my friend Mr. Fencker, one of the Danish officials at Godhavn, Island of Disco. I expect that, on inquiry, it will be found that these eggs were not collected by, nor under the personal supervision of, Mr. Fencker, but obtained by him from native Greenlanders during his official visits to the settlements on the mainland opposite Disco Island. I regret that I am unable to give a precise account of the proceedings of the expedition to which Mr. Ludwig Kumlein was attached as naturalist; but the following brief sketch will, I think, be found substantially correct. On the return of the British Polar Expedition in 1876, it was urged by Captain Howgate, of the United States Army, that an attempt to reach the North Pole should be inaugurated by planting small colonies along the shores of Smith Sound, which would form the basis for further operations. Some money was collected for this purpose, but on a scale quite inadequate for a scheme of such proportions; however, a small sailing-vessel was fitted out as a tentative measure, and despatched to Davis Strait in 1877, under the command of Captain G. E. Tyson. I do not suppose that a voyage to the Polar Regions was ever seriously entertained by this expedition, which was totally unfit for such an attempt; at any rate the vessel wintered no further north than Cumberland Sound, which is situated on the west side of Davis Strait, a little south of the Arctic circle, and where American vessels engaged in whaling not unfrequently winter. In the summer of 1878

Captain Tyson crossed Davis Strait in his vessel, called in at Godhavn, and afterwards returned to the United States. I think it highly probable that the supposed Curlew Sandpiper's eggs were obtained by Mr. Kumlein from Mr. Fencker during this visit to Godhavn, and that Mr. Kumlein did not personally find *Tringa subarquata* nesting in the district of Christianshaab, North Greenland." Under these circumstances, therefore, we must await further evidence, before giving implicit credence to the report that the eggs of the Curlew Sandpiper have really been discovered.—J. E. Harting.

Early assumption of Summer Plumage in the Black-headed Gull.—A specimen of this elegant Gull, caught inland during the second week of January, was beginning to assume the summer dark hood. The disk of the "mask" was very distinctly marked, and the border did not extend beyond the face behind the eyes,—not reaching the neck,—resembling the representations of the so-called "Masked Gull," which, by-the-bye, is neither figured nor referred to by Mr. Gould, in his 'Birds of Great Britain.' The upper part of the breast, the whole of the tail and tail-coverts of this specimen are pure white, but the lower part of the breast and belly are light buff-yellow—probably this was rose-colour when the bird was alive; the bill and feet bright coral-red. I have sent this notice more especially to call attention to the unusual early change of plumage in this specimen, which appears to be quite adult, both from the absence of any black at the end of the tail, and from the unsullied character of the delicate French grey of the dorsal plumage.—Edward Hearle Rodd (Penzance, January 19th).

[With unfeigned regret we mark this communication as the last we shall ever receive from our late friend and correspondent, Edward Hearle Rodd, by whose death we have lost one of the oldest and most valued contributors to the pages of this Journal. See page 113.—Ed.]

Immigration of Long-eared Owls in Wiltshire.—In reference to Mr. Gatcombe's account, in the number of 'The Zoologist' for February (p. 49), of the strange irruption of Long-eared Owls in Devonshire, and his surprise that nothing has been said of their appearance in like manner in other places, I beg to state that I received information not long since from the south of this county, that two gentlemen while shooting in Groveley Wood, not far from Salisbury, about the middle of November last, came upon a flight of Long-eared Owls, whose numbers they estimated at about twenty, and which seemed to fly out of every tree. The same sportsmen were again in Groveley Wood in the following week on November 29th, and four Long-eared Owls flew out of one tree. The frost was very severe at the time. As this was the first occasion on which I had heard of such a flight of Long eared Owls, I ventured very delicately to enquire whether there might by possibility be any mistake as to the species, and whether they might not have been Short-eared Owls, which notoriously do sometimes appear in packs; but my informant, who is an excellent ornithologist, assured me that there was no room for doubt as to the species, the sportsmen in question being both practical field naturalists, and their information perfectly reliable. This statement completely satisfied me; and now Mr. Gatcombe's account of a similar flight in Devonshire corroborates the statement, and shows that the arrival of a considerable body of Long-eared Owls is not peculiar to either county.—Alfred Charles Smith (Yatesbury Rectory, Calne). [Mr. W. Oxenden Hammond, of St. Alban's Court, near Wingham, Kent, has favoured us with a note of a similar occurrence on his own property last autumn.—Ed.]

Wagtails gregarious at Roosting Time (Zoologist, 1878, p. 390).—There is a large reed-bed in the river here, almost close to the highway. where in the autumn—and notably during the month of October last—hundreds of small birds of the Swallow and Wagtail class chatter and roost; in fact, just before dark they flock in from all quarters, and it seems almost incredible that so many inhabit the neighbourhood, and yet are so seldom seen at any other but roosting time. Sometimes of an evening I have seen such numbers of Wagtails—not all the same species—flitting and chirping over this much-loved resort, that the very reeds seemed alive with them, and yet in a great measure each species had its own particular mode of procedure. One evening, especially, I noticed a number of Pied Wagtails settle upon a fence in a field adjoining the river; and, what is remarkable, each bird was perched about a yard from its fellow, watching the insects which danced over the stream before them, and occasionally darting out and catching one of them, but as often returning to the fence. Whilst thus engaged numbers of the other species—Grey Wagtails possibly—were restlessly flying about over the reeds, settling here and there, keeping up an incessant chirping, and looking at a distance almost like some light-coloured moths flitting and dancing up and down above the reeds, for the white feathers of the tail were very conspicuous.—G. B. Corbin (Ringwood, Hants).

Wildfowl at Larne, Co. Antrim.—During the month of December last the Wildfowl were so starved with hunger that, instead of remaining in their usual haunts, they resorted to the sea-beach for food. Golden Plover, Snipe, and even Woodcock were plentifully shot there. Large flocks of Wild Geese and Swans passed over Glenarm much exhausted. One Swan dropped from the flock in Glenarm Park, and was shot next day; it proved to be a young Bewick's Swan. Gulls of various species were very common along the shore. Amongst them I observed four Iceland Gulls; one of these was shot in December in immature plumage. The spring of last year was so wet and cold that a great number of eggs were destroyed, and, even where the brood came out, the young birds in many cases died. Hence a marked diminution of our resident birds has taken place; but very few Swifts, Swallows, and Martins made their appearance during April and May, and many of their breeding quarters were quite forsaken.—THOMAS BRUNTON (Glenarm Castle, Larne).

OCCURRENCE OF THE ALPINE SWIFT IN DEVONSHIRE.—When out shooting along the coast with my brother, on the 4th October, 1876, he shot a young specimen of the Alpine Swift (*Cypselus melba*, Illiger), which was flying with two others in company with *C. apus*, of which there were about a score. We thought they would lodge on the cliff for the night, but nothing was to be seen of them next morning. Unfortunately the other two never came within gunshot. I have the skin in my possession.—H. E. RAWSON (The Vicarage, Bramley Common).

[The occurrence in the British Islands of this fine Swift—which is found in Central and Southern Europe, Western Asia, and Africa—has been recorded some score of times, during the months of March, May, June, July, August, September, and October. The 4th October is a late date at which to find the Common Swift still here, but is not unprecedented. An Alpine Swift procured in Norfolk was shot on the 13th October, 1831, and another was obtained at Hulme, near Manchester, on the 18th October, 1863. Yarrell, in the Preface to the first edition of his 'British Birds,' refers to one killed at Oakingham on the 8th October, 1841.—ED.]

OCCURRENCE OF THE HEN HARRIER IN LONDON.—A male specimen of this bird was picked up, dead, in the grounds adjoining Hereford House, Brompton, on the 20th January. One of the workmen in the employ of Mr. W. H. Chapman, builder, upon going through the grounds, at an early hour, found the bird (which had been wounded in the wing) dead, but the blood-stain fresh. The grounds of Hereford House cover an extent of about five acres, and contain many lofty trees, upon which there is a rookery, and are not at all a likely resort of a Harrier. I imagine the bird had probably been wounded in the outskirts of the town, and had dropped from exhaustion on the spot where it was found. Mr. Chapman was good enough to bring the specimen to me, as it appeared to him an uncommon bird, and I have preserved and added it to my collection. The specimen is in grey plumage, but is not an extremely old bird.—EDWARD HARGITT (1, Bedford Road, Bedford Park, Chiswick).

POMATORHINE SKUA AND OTHER BIRDS IN BEDFORDSHIRE.—One specimen only of the Pomatorhine Skua was, so far as I am aware, captured in Bedfordshire during the late autumnal immigration of Skuas. This one was shot at Ravensham, near Bedford, on the 18th October last. A male Goosander was shot on the 2nd December, at Compton Mills, by Mr. George Hare. On the 8th of the same month a male Bittern was obtained at Chicksands Priory, by one of Sir George Osborn's keepers. A Great Crested Grebe was killed at Landy, on January 9th, by Mr. James Dillemore, as I am informed by Mr. Wright, the taxidermist, of Clifton. Curiously enough, with the exception of the birds above mentioned, this winter, as regards Bedfordshire, has been singularly unproductive in ornithological rarities.—C. Matthew Prior (The Avenue, Bedford).

Ornithological Notes from West Cumberland.—An adult male Pomatorhine Skua was shot on October 16th, by some fishermen about ten miles off Whitehaven Harbour; it had a mate, which escaped. A single Bernicle Goose was seen flying about the mouth of the River Irt from the 20th October to the 3rd November, and seemed very tame A flock of nine appeared on December 5th, near Seascale, flying towards the Irt. Two of them were were shot near Braystones, and sixteen were seen at Drigg soon after. Several Goldeneyes have frequented this winter; one, a female, was shot on the 14th November. I notice that these birds are always seen at the same spot, where the river is still and narrow. The other ducks stay lower down, where it has widened into a small estuary. In the same bend an immature "Calloo," or Long-tailed Duck, was shot on the 22nd November, and sent to me; there were three more in company with it. A Scoter was shot on December 20th on the shore opposite Seascale Station; it sat stupidly on the water, about forty yards from the beach, and was deliberately "potted;" it was gorged with mussels and razor-shells, some of the latter being three inches long. At least one pair of Sheldrakes have wintered with us, which is unusual. During the second week of December three Swans were seen in several parts of this district, sometimes at the mouth of the river, and sometimes inland near the mountains. I am glad to say they were not fired at. On two occasions they were flying very near the ground.—C. A. Parker (Gosforth, Carnforth).

Ornithological Notes from the Isle of Wight —Last summer a pair of Wagtails built a nest beneath the iron rail at St. John's Station, Ryde, and the young birds were reared, undisturbed by the constantly passing trains; and I am told by a railway official that a pair of Wagtails, some years since, constructed their nest in a similar manner at the same spot. The Landrail was unusually abundant last summer in the Isle of Wight. In October a Great Snipe was shot at Atherfield, by Mr. T. Way; it is of rare occurrence in the island. A Brent Goose was shot on December 11th, at Luccombe; it rose from among the rocks on the shore, and on being fired at and wounded, settled on the water, where it was eventually secured. It proved to be a bird of the season, the patch on the neck obscure, there being little white about it. Owing to a malformation of the beak, the upper mandible was about half the length of the lower, but broader, well rounded, and decurved at the tip. The lower mandible and tongue partly exposed; this deformity, the bill being uninjured by shot, must have greatly hindered the bird in feeding; it was in poor condition, and somewhat small in size.—Henry Hadfield (High Cliff, Ventnor, Isle of Wight).

Great Bustard in Kent.—In addition to the list of Bustards recorded in 'The Zoologist' (pp. 25, 26) as killed in Cornwall, Essex, and Jersey, I have to report three recently obtained in Kent. The first of these was shot at Romney Marsh towards the end of December last, the sex of which I have not been able to ascertain. The second, an immature female bird weighing eight pounds and a half, was taken early in January at Great Chard, near Ashford; and the third, a full-grown male weighing sixteen pounds, was shot near Wye about the latter end of January. This bird had been observed by the occupier of the land it was on, and he was anxious that it should be left unmolested; but a trespasser, much to his annoyance, went in pursuit and shot it.—H. A. Dombrain (Westwell Vicarage, Ashford, Kent).

Great Bustard in Essex and Cambridgeshire.—On the 5th December last, a Great Bustard was procured by Mr. Porter near Chelmsford, and on February 6th, another, a hen-bird, was taken at Mr. Jonas's, at West Wickham, Cambridgeshire. Both are now in my hands for preservation.—T. Travis (Naturalist, Saffron Walden).

[The specimen shot at Woodham Ferrers, Essex, on December 5th (*anteà* p. 26), was, we have since ascertained, a hen bird, in good plumage, weighing 10 lbs. Length, 3 ft. 9 in. Extent of wings, 7 ft.—Ed.]

Great Bustard in Dorsetshire.—I have in my possession a Great Bustard which was shot on the 10th January last, in a turnip-field adjoining the Cranborne Downs. It proved to be a female bird, in fine condition, and weighed close on nine pounds.—Edward Hart (Christchurch).

Little Bustard at Eastbourne.—On December 11th I shot a Little Bustard at Eastbourne. This rare and beautiful bird is the only specimen known to have been shot in the county of Sussex during the last century. The bird was in good condition; weight 2 lbs. 1 oz. It is now in the care of Mr. Swaysland, of Brighton, who will be pleased to allow any person to view the same.—Martin Spiller (Devonshire Club, Eastbourne).

[It is a mistake to suppose that none have been killed in Sussex for a century. See Knox's 'Ornithological Rambles.'—Ed.]

The Great Shearwater: its Posture while at Rest.—At a meeting of the Royal Physical Society of Edinburgh, on December 17th, a specimen of the Great Shearwater, *Puffinus major*, lately shot at North Berwick, was exhibited. This bird, which is now in the Edinburgh Museum, is stuffed in an upright position, after the manner of the Guillemots and other divers. While the rarity of the bird was remarked upon it was also mentioned that, as this species had seldom or never been observed on land, the actual sitting posture was uncertain. I should now like to say a few words concerning this matter. I recorded in 'The Zoologist' of November, 1878, that one of these birds had been shot by my father in August of that year, at North Berwick. When shot this bird was sitting upon a large piece of wreckage floating about half a mile out at sea, and as the boat approached my father had a good opportunity of observing its attitude while at rest, which was as nearly as possible that of the Herring Gull, or other allied species, but certainly had no resemblance to the sitting posture of the *Alcidæ*. I would refer to the beautiful illustration of this bird in the third volume of Yarrell's 'British Birds.'—C. CHAMBERS (339, High Street, Edinburgh).

AMERICAN SWAN IN SCOTLAND.—On the 26th December, 1879, I noticed three Swans hanging in a poulterer's shop in Edinburgh. On going in I found there were five in all. Believing them to be Bewick's Swans, I sent down Hope, the birdstuffer, who bought and preserved four of them. Two were reserved for the Industrial Museum at Edinburgh, and the other two are in my possession. On dissection, however, they turned out to be adult specimens of *Cygnus americanus*—one male and three females. The sternum is fully two inches longer than that of Bewick's bird, and the formation of the windpipe also differs. The ribs were ten in number, and one specimen at least had twenty feathers in the tail. Three of them are to be exhibited at the next meeting of the Physical Society of Edinburgh, when a paper will be read on the subject. The fifth bird has been preserved in skeleton. Only one specimen of this species has been obtained previously in the British Isles to my knowledge. Three were shot in Argyleshire, and the other two at Tain, in Sutherlandshire.—CHARLES A. PARKER (Gosforth, Carnforth).

CORN CRAKE CARRYING ITS YOUNG.—The Landrail, or Corn Crake, usually frequents and makes its nest amongst long meadow-grass, generally depositing from four to six or seven eggs, sometimes as many as nine or ten. The broods are often too young to escape before the cutting begins, and the machine makes sad havoc among them; the bewildering sharp "clack-clack" of the machinery seems to stupefy both mother and young ones, so that the poor things are often maimed or killed. In August last, while cutting-down a field of grass, a Corn Crake was observed to rise close in front of the machine and to flutter backwards and forwards, crying pitifully; but, as it waa impossible to stop before the scythe had passed over the spot, it was concluded the young had been killed. On looking round at the spot, however, soon afterwards, the mother was noticed where the nest had been, and presently she came out to the open field, carrying in her beak a small dark object, which, on following her, was found to be a young Crake, evidently not more than an hour or two out of the shell, and too young to walk or run, but happily uninjured by the machinery. The old bird now laid down her helpless young one, and returned, apparently to look for the rest of the brood. The workman, however, having meantime found another, laid it beside the first; which, doubtless, the mother removed to a safe place, as on looking for them soon afterwards, all had disappeared. —M. Allison (Hollywood, Mulhuddart, Dublin).

The Hebridal Argentine.—A most interesting fish was captured in Loch Alsh, near the Skye shore, last October, by a fisherman using a hand-line, the hook being baited with a piece of mussel. Yarrell, who received an example six inches and a half long from Glasgow, in November, 1837, termed it the "Hebridal Argentine"; it likewise was taken on a hand-line, in the Bay of Rothsay, about two hundred yards from the shore, in twelve-fathom water, where, though it was said to be well known, it was but rarely seen. Another, eight inches long and full of roe, was secured near the same place in June, 1836. A third has also been recorded from Redcar, captured in May, 1852. It appears to frequent the coast of Norway as well as that of Scotland, while a fish was washed ashore on the South Spit, Hokitika, New Zealand, which is described by Mr. Clarke in the 'Transactions of the New Zealand Institute,' 1878, p. 296, vol. xi., as *Argentina decagon*, which exactly agrees with the example of the Hebridal Argentine (*Argentina Hebridica*), now lying before me. Although Yarrell observed that it was "well known, but rarely seen," it does not appear that examples exist in our public museums. Couch observes that this fish "is not rare in the sea near the islands to the north of Scotland," but omits giving his authority for this statement, irrespective of which, he did not procure a specimen, and therefore inserted a figure from Schneider which is very unlike the Hebridal Argentine. The beautiful shining scales of this fish, its flat back, flat sides, and almost flat under surface, give it the appearance of being tetragonal. There are many questions as to its habits and internal anatomy which still require to be investigated. It is believed that, in Europe, it lives at great depths, and never enters fresh water. In Norway it is stated to be usually captured after cold and stormy weather. Mr. Clarke suggests whether, if his species is identical with the European form, it had worked its way *sub mare* in the cold strata of water from the northern to the southern hemisphere.—Francis Day (Kenilworth House, Pittville, Cheltenham).

Late stay of Pilchards and early arrival of Mackerel on the Cornish Coast.—A circumstance which has no precedent within the memory of the oldest fishermen here seems worth recording. Usually the Pilchard season ends on our coast at St Ives with November. Occasionally a stray shoal has been taken in, and even at the end of, December, but this is quite an exceptional occurrence. This last season has run right on into January, and the fishing of the latter part of the season has been more productive than that of the earlier part. Usually the Mackerel do not arrive on our western coasts until the end of February. This year they are with us already (28th January). I can offer no explanation of these remarkable facts.—THOMAS CORNISH (Penzance).

POPULAR NAMES OF ANIMALS.—I am preparing for the English Dialect Society a dictionary of the popular names of animals, reptiles, crustacea, and insects; in fact, of all zoological objects excepting birds and fishes, which are in the hands of the Rev. C. Swainson and Mr. T. Satchell respectively. I shall be very grateful for any help which the readers of 'The Zoologist' can afford me.—JAMES BRITTEN (British Museum).

THE LATE MR. EDWARD HEARLE RODD.—A valued correspondent and one of the oldest contributors to the pages of 'The Zoologist' has passed away, in the person of Edward Hearle Rodd, who died at Penzance on the 24th January last, from a combined attack of bronchitis and pleurisy. It is with unfeigned regret that we record this event, a regret which we feel sure will be shared not only by those of our readers who were personally acquainted with him, but by those also who knew him only by correspondence and by his published communications to this journal. Mr. Rodd was one of those who took the greatest delight in out-door observation, and especially the observation of the feathered tribes. From the year 1843, when this journal was commenced, until the time of his death, at the age of sixty-nine, he was in the constant habit of taking notes on his favourite subject, which he communicated from time to time to these pages; and very valuable many of these notes are. Owing to the zeal and exertion of Mr. Rodd, many a rare bird in Cornwall has been rescued from oblivion; while several species, such as the Spotted Eagle, Lesser Grey Shrike, Red-breasted Flycatcher, and American Little Stint, have been added to the British list entirely through his instrumentality. He was especially interested in the subject of migration, and the large number of facts which he has recorded in connection therewith, not only in these pages, but in the 'Journal of the Royal Institution of Cornwall,' and in the Natural History columns of 'The Field,' will be found of material value by those who may desire reliable statistics from which to generalize.

In 1864 Mr. Rodd published an octavo pamphlet of forty-two pages, entitled 'A List of British Birds, as a Guide to the Ornithology of Cornwall,' a second edition of which appeared in 1869. At the date of his death he had for some time been engaged, at our earnest entreaty, in the preparation of a more extensive work on the Birds of Cornwall; and we are happy to state that, the whole of his MS. notes for this work having been placed in our hands, steps were at once taken to secure its publication in a form calculated to benefit science and enhance the reputation of the author. Five sheets, or eighty pages, were revised by Mr. Rodd, the fifth sheet only a week before his death, and it is much to be regretted that he has not lived to see the completion of an undertaking in which he took so much interest. The work, however, will proceed, and its publication, by Messrs. Trübner and Co., may be shortly expected.

In the county in which he resided Mr. Rodd was greatly esteemed and respected. The third son of the Rev. Edward Rodd, D.D., he was born at St. Just in Roseland, of which parish his father was vicar, in March, 1810. Educated for the law, he was admitted to practice as a solicitor in Trinity Term, 1832, and early in the following year went to reside at Penzance, where he entered into partnership with Mr. George Dennis John. At Mr. John's decease, Mr. Rodd was joined by Mr. Darke, and, soon after the death of the latter, the firm became Messrs. Rodd and Cornish. About two years ago Mr. Rodd retired from the firm, resigning at the same time the office of Town Clerk of Penzance, to which he had been elected in 1847, and of Clerk to the Local Board, to which he was appointed in 1849, Penzance having been the second town in England to adopt the Public Health Act, 1848. Mr. Rodd at the same time resigned the Clerkship to the Penzance Board of Guardians, an office which he had held from the passing of the Poor Law Act. Both the Penzance Corporation and the Board of Guardians accepted his resignation with regret, and gave expression to their appreciation of long and faithful service. In addition to the offices above mentioned, Mr. Rodd was Superintendent Registrar, and, from 1844 till the abolition of the office in 1867, Head Distributor of Stamps in Cornwall. Of the Penzance Choral Society he was one of the founders and warmest supporters, nothing but illness or absence from home keeping him away from the practices. By his death a vacancy is created in the Vice-Presidency of the Society, a position he had occupied from the first. Mr. Rodd also took a deep interest in St. Mary's Sunday Schools, of which he was one of the oldest teachers, and but a few weeks before his death he presided at a New Year's entertainment given to the boys.

The welcome guest in many a country house between the Land's End and the Tamar, Mr. Rodd took the liveliest concern in the welfare of the poor, to whom he was known to be a liberal friend. The fishermen, especially, will have cause to regret his decease, since he always had their interests at heart. By his death (says the Editor of 'The Cornish Telegraph'), "Penzance has lost an adopted son whom she delighted to honour, as a man of unblemished character, urbane and courteous to the highest degree, and one whose greatest delight was in serving a friend, or advancing the interests of those whose only claim on him was that of a common humanity."

We understand that Mr. Rodd's fine collection of Cornish Birds, many of them extremely rare, and all beautifully mounted by Mr. Vingoe, of Penzance, have been removed to the residence of his elder brother, Mr. Francis Rodd, of Trebartha Hall, by whom they will be carefully preserved.

THE LATE DR. T. M. BREWER.—Ornithologists will hear with deep regret the news of the death of Dr. Thomas Mayo Brewer, of Boston, Mass., which took place on January 23rd, after a short illness. The grandson of Colonel James Brewer (a leader of the "Boston tea party" of 1773, and an active partisan in the subsequent revolution), T. M. Brewer, born in Boston in 1814, took an early and lively interest in politics and also in Natural History—these widely divergent subjects furnishing, however, for some time merely the occupation for the leisure hours spared from his duties as practising physician. This versatility of talent led to connection in an editorial or managerial position with several important journals; but it is as an ornithologist that we must now speak of him, for as such he is most widely known on this side of the water. In 1839, when only twenty-five years of age, Dr. Brewer had already brought out a new edition of Wilson's 'Ornithology,' with a synopsis of all the North American species then known; and years later he commenced his 'Oology of North America,' a grand work, of which only one volume was issued, the great expense causing the relinquishment of its publication by the Smithsonian Institution. In conjunction with Prof. Spencer Baird and Mr. R. Ridgway, he commenced, in 1874, a 'History of North American Birds,' and in addition to these more important works he was an active and valuable contributor to the 'Bulletin of the Nuttall Ornithological Club,' one of the best quarterly journals in existence on the subject of birds and bird literature. During a recent residence of two years in Europe many of us had the opportunity of enjoying his genial society, and to those who did not know him personally, his writings and correspondence, sparkling as they were, can convey but little idea of the loss his friends have sustained.—*From 'The Field.'*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 15, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

Messrs. John Poland (Blackheath), J. Darell Stephens (Plympton), and Prof. Allen Thomson were elected Fellows, and T. Jeffery Parker (Tooting) an Associate of the Society.

Mr. A. J. Hewett exhibited and made remarks on a common web or community of cocoons and the moths (genus *Anaphe?*) escaped therefrom, said to have been brought from Old Calabar.

Some Moa's bones,—*viz.*, a tibia and tarsus of a specimen of *Dinornis maximus*,—obtained four feet from the surface at Omaru, New Zealand, were shown on behalf of Mr. James Forsyth.

A paper was read "On the Birds and Mammals introduced into New Zealand," by H. M. Brewer, Hon. Sec. Wanganui Acclim. Soc., New Zealand. The author refers to Dr, Buller's volume on the New Zealand Avifauna as not written too soon, for the rapid disappearance of many highly interesting forms is already to be deplored—to wit, the Kakapo (*Stringops habroptilus*), New Zealand Quail (*Coturnix Novæ-Zealandiæ*), Bell Bird (*Anthornis melanura*), &c. But to import English birds to employ their places is not without its difficulties. Native enemies are to be contended with; for example, the New Zealand Owl (*Ninox Novæ-Zealandiæ*), wages destructive warfare against the smaller finches and song birds. Of one hundred Diamond Sparrows liberated on the island of Kawau, by Sir George Grey, few escaped the ravages of this little Owl; and on the Hon. Mr. Stafford's grounds at Wellington a number of insectivorous birds being let loose soon attracted a host of these Owls, to the serious discomfiture of the former. Finches of various sorts have nevertheless succeeded, and undoubtedly increased to such an extent that there is now no danger of their extermination. The Sky Lark may even be found enlivening some districts with its cheerful varied music. Of other species acclimatised, may be mentioned the Starling, Thrush, Blackbird, Chaffinch, Goldfinch, Yellowhammer, House and Hedge Sparrow, Indian Minah, Ring Dove, Golden Plover, Jay, Australian and Tasmanian Magpies, Muscovy Duck, Black and White Swans, Californian, Australian and Madagascar Quails, Partridges, Pintail Grouse, and Pheasants of various sorts, &c. The Pheasant now abounds, and even shooting licenses are granted. Fifteen birds were turned out in the Wanganui district in 1866; these have now spread all over the province, even far inland. Two friends of the author bagged seventy in one day, and this by plain open shooting. The Chinese Pheasant (*P. torquatus*) is most numerous, although the common sort (*P. colchicus*) is increasing. It is a singular circumstance that on the occurrence of a tremor of the ground from an earthquake, the cock Pheasants set up a continuous crow either of fear or defiance. In the North Island the Partridge (*Perdix cinerea*) thrives less vigorously than in the South Island; Canterbury, especially, with its cereal crops, affording a better feeding and breeding ground. The Red-legged Partridge (*Caccabis rufa*) is plentiful in the Rangiteiki district of the Wellington Province, but appears to remain where first located. Blackbirds and Thrushes and the Indian Mynah (*Acridotheris ginginianus?*) are seen in large numbers in the

Nelson Province. Of Mammals imported by the Societies, the following are the chief:—The Red, Fallow, Sambur and Californian Deer, Angora Goat, Hare, Kangaroos, Wallabees, and Opossums. A consignment from England of thirty-three Fallow Deer was lately made by Mr. Larkworthy, and of twenty-eight which arrived in safety eighteen were turned out in the Waikato and ten in the Wanganui district. On the hills in the neighbourhood of Nelson large herds of wild Red Deer are reported to have been seen. Fallow Deer set free near Richmond have increased. Hares have increased almost too rapidly, and one particular feature is their fecundity in New Zealand, for the female brings forth six and seven at a birth. Already southern farmers complain of the Hares being too numerous, and Coursing Clubs meet bi-weekly during the season. Thus, from a former paucity of mammalian life in New Zealand, there is now a tendency to the contrary, and possibly in a few years its fauna will have approximated to that of the mother country.*

February 5.—WILLIAM CARRUTHERS, F.R.S., Vice-President, in the chair.

Dr. Francis Day exhibited examples of *Salmonidæ*, some of which had been reared under natural and others under unnatural conditions. A *Salmo fontinalis* which had passed its existence in the Westminster Aquarium had the head preternaturally elongated with a very narrow suboperculum; thus showing a great contrast to examples reared in Cardiganshire from the same batch of imported eggs. He also exhibited a very slender young Salmon, reared by Mr. F. Buckland in the Horticultural Gardens, where, of course, its instinctive migration to the sea had been prevented.

Mr. A. Hammond showed under the microscope a larva of *Tanypus maculatus*. He mentioned that the coronet and appendages of the thoracic and anal regions had been said to be homologous with the respiratory organs of the larva and pupa of gnats, &c. This he doubted, inasmuch as the former originated from the ventral, and not from the dorsal, surface, as did the latter, and no tracheæ of any size could be discerned. He also stated his opinion that the two oval bodies in the thorax of the larva, which De Geer considered as reservoirs of air, were probably salivary glands similar to those he (Mr. Hammond) had previously observed in the larva of the crane-fly.

The Secretary then read a communication by H. M. Brewer, Hon. Sec. Wanganui Acclim. Soc. New Zealand, "On the *Salmonidæ* and other Fish introduced into New Zealand Waters."—J. MURIE.

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* We cannot too strongly reprobate the practice, which seems to be gaining ground, of introducing into the colonies animals which will eventually cause the extermination of many remarkable indigenous forms, and which lead to much confusion in zoo-geographical science.—ED.

Zoological Society of London.

January 6, 1880.—Prof. Flower, LL.D., F.R.S., President, in the chair.

Prof. Newton exhibited, on behalf of Mr. G. B. Corbin, a specimen of the Needle-tailed Swift (*Acanthyllis* sive *Chætura caudacuta*), shot near Ringwood, in Hampshire, in July, 1879, remarking that it was the second example of this Siberian species which had been obtained in England.

Mr. John Henry Steel read a series of preliminary notes on the individual variations observed in the osteological and myological structure of the Domestic Ass (*Equus asinus*).

A communication was read from Mr. E. W. White, containing notes on the distribution and habits of *Chlamyphorus truncatus*, from observations made by the author during a recent excursion into the Western Provinces of the Argentine Republic, undertaken for the purpose of obtaining a better knowledge of this animal.

Dr. John Mulvany, R.N., read a paper on a case which seemed to him to indicate the moulting of the horny beak in a Penguin of the genus *Eudyptes*.

Mr. O. Thomas read a description of a new species of *Mus*, obtained from the island of Ovalau, Fiji, by Baron A. Von Hügel, and proposed to be called *Mus Huegeli*, after its discoverer.

A communication was read from Mr. R. G. Wardlaw Ramsay, containing a report on a collection of birds made by Mr. Bock, a naturalist employed by the late Lord Tweeddale, in the neighbourhood of Padang. Three species were described as new, and proposed to be called *Dicrurus sumatranus*, *Turdinus marmoratus*, and *Myiophoneus castaneus*.

Dr. Günther read a description of two new species of Antelopes of the genus *Neotragus*, *N. Kirki*, from Eastern Africa, and *N. molaris*, from Damara-land.

January 20.—Prof. Flower, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1879, amongst which special attention was called to a pair of Prong-horn Antelopes, purchased December 4th; and to two rare species of Parrots, of the genus *Chrysotis*, purchased December 18th.

Mr. H. N. Moseley exhibited and made remarks on some microscopic preparations of Corals made by a new method invented by Dr. G. V. Koch.

Prof. Flower read a letter addressed to him by Colonel Heysham, of the Madras Commissariat Staff, giving particulars of two cases of female Elephants, in India, having produced young in captivity.

Dr. A. Günther exhibited and made remarks on a drawing of a West Indian fish (*Holacanthus tricolor*), obtained on the coast of the island of Lewis, and believed to have been found for the first time in the British Seas.

Mr. P. L. Sclater read some remarks on the species of the genus *Tyrannus*, in relation to a paper on this subject recently published by Mr. Ridgway, in America.

A communication was read from Mr. Roland Trimen, containing an account of a new species of Roller (*Coracias*), from the Zambesi, which he proposed to name *C. spatulata*, from its long spatulated tail.

A communication was read from Mr. Alexander Agassiz, of Cambridge, Mass., containing notes on some points in the history of the synonymy of *Echini*, in reference to some papers recently published by Mr. Bell in the Society's 'Proceedings.'

A paper was read by Mr. F. Moore on the genera and species of the Lepidopterous subfamily *Ophiderinæ*, inhabiting the Indian Region.

February 3.—Prof. Flower, LL.D., F.R.S., President, in the chair.

Capt. W. Vincent Legge, R.A., exhibited and made some remarks upon some specimens of the Little Ringed Plovers of India and Ceylon.

A communication was read from Dr. G. Hartlaub, containing the description of a new species of Heron, obtained in Mohambo, in Northern Madagascar, which he proposed to name *Ardea Rutenbergi*.

Mr. Oldfield Thomas read a note on a specimen of *Myoxus elegans*, Temminck, which had been obtained by Mr. H. Pryer, near Yokohama, Japan.

A communication was read from Mr. H. N. Moseley, containing the description of a new species of Simple Coral, which he proposed to call *Desmophyllum lamprosteichus*.

Prof. F. Jeffrey Bell gave an account of *Palæolampas*, a new species of irregular *Echinoidea*, which presented, among others, the following archaic points:—(1) the rows of pores were completely parallel, and extended regularly to the ambitus; (2) some of the pores exhibited an elongation indicating the appearance of the connecting grove; (3) the outer row of each pore-series was continued uninterruptedly to the actinostome; and (4) two of the ocular pores retained indications of their primitively double character.

Messrs. C. J. Danford and E. R. Alston read Part II. of a paper "On the Mammals of Asia Minor," in which they added certain species to their former list, and described a new species of Vole under the name of *Arvicola Guentheri*.

Mr. Sclater exhibited and made remarks on a fifth collection of birds from Duke of York Island and its vicinity, which he had received from the

Rev. George Brown. Four species were described as new, and proposed to be called *Megalurus interscapularis*, *Pœcilodryas æthiops*, *Munia melæna*, and *Rallus insignis*.—P. L. Sclater, *Secretary*.

Entomological Society of London.

December 3, 1879.—J. W. Dunning, M.A., F.L.S., Vice-President, in the chair.

Donations to the Library having been announced, and thanks voted to the respective donors, the Chairman read out a list of the names of the Officers and Council proposed for election on January 21st, 1880.

Mr. Howard Vaughan exhibited a series of remarkable varieties of *Lycæna Corydon*, taken at Dover, one specimen, a female, being suffused with blue on the upper side of the left pair of wings only, whilst the right wings were uniformly brown.

Mr. W. L. Distant exhibited a hitherto unrecorded variety of *Danais plexippus*, Linn. (commonly known as *D. archippus*), received from Antigua, in which the rufous coloration was quite absent, the ground colour being dull pale testaceous. Although another similar specimen was received, the variety could not be considered as a local form, Antiguan specimens of the species usually being typical.

Mr. T. R. Billups exhibited the following beetles;—*Pseudopsis sulcata* (Box Hill); *Agathidium nigrinum* (Caterham Valley); *Anisotoma grandis* (Box Hill); *Leptinus testaceus* (Burford Bridge); and *Carabus auratus*, taken in the Borough Market.

Mr. C. O. Waterhouse mentioned a remarkable instance of tenacity of life observed by Dr. Percy in a specimen of *Curculio cleonus*.

The Rev. H. S. Gorham read a paper entitled "Materials for a Revision of the *Lampyridæ*."

In connection with the light-emitting power of this family, Mr. Bates remarked that certain species of Longicorns mimicked Lampyrids with great exactness, the light-giving segments of the latter being perfectly represented in the Longicorns, although destitute of phosphorescent power.

Mr. J. W. Slater communicated a paper "On certain Minute Characters of Insects, with reference to the Theory of Evolution."

Mr. Roland Trimen communicated a paper "On some hitherto undetermined Butterflies inhabiting Southern Africa."

Mr. P. H. Gosse, F.R,S., communicated a paper "On *Papilio Homerus*, its Ovum and Larva," the habitat of which is limited to restricted regions in the island of Jamaica.—R. Meldola, *Hon. Sec.*